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ABSTRACT

This report presents abstracts of studies in progress and of research completed from 1957 through 1969. Included in the former are studies of merit scholars, talented Negro students, and participants in the national talent search. Completed studies are grouped under these major headings: characteristics of able students, progress of scholars, the Merit Program, scholarships and the conservation of talent; prediction of performance, characteristics of colleges, college effects, career choice, twin studies, assessment methods, and research methods. A number of studies are reported under each heading and reprints of many are available. [Not available in hard copy due to marginal legibility of original document.] (DG)

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NATIONAL MERIT SCHOLARSHIP CORPORATION

NATIONAL MERIT SCHOLARSHIP CORPORATION

Edward C. Smith, President

The National Merit Scholarship Corporation was founded in 1955 for the purpose of annually identifying and honoring the nation's most talented youth. Merit Scholarships, which are awarded on a competitive basis, provide financial assistance that Scholars use to attend the colleges of their choice.

The NMSC research program was established in 1957 to conduct scholarly research related to the source, identification and development of intellectual talent. NMSC Research Reports are one means of communicating the research program's results to interested individuals.

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REVIEW OF RESEARCH

The National Merit Scholarship Corporation conducts the nation's largest private scholarship program. In carrying out an annual nationwide talent search, large numbers of talented high school seniors are identified and many of them are provided direct assistance in financing their college educations. Many others are helped indirectly to attain financial aid from other sources because of their high performance in the Merit competition.

NMSC's research program is designed to take advantage of the data resulting from the national talent search and to study the career development of the talented students who are identified. The main objective of NMSC research is to conduct scholarly research related to the source, identification, and development of intellectual talent.

This report is divided into two parts: Studies in Progress and Studies Completed in Previous Years. In general, three types of studies are currently in progress: (a) longitudinal studies of Merit Scholars, (b) studies of talented Negro students, and (c) studies of participants in the national talent search. Previous studies include those conducted from 1957, when the NMSC research program was established, through 1969.

STUDIES IN PROGRESS

LONGITUDINAL STUDIES OF MERIT SCHOLARS

1. A followup questionnaire is being designed to study the longitudinal progress of Merit Scholars. The first decade of Scholars (1956-1965) will be included. A total of 11,110 Merit Scholarships were awarded during this period. Areas to be emphasized on the questionnaire are educational attainments, career progress, home and family, and awards and achievements. We are particularly interested in the accomplishments of the women Scholars and the problems they experience in establishing their careers.

2. Characteristics of Merit Scholars who are dissatisfied with their progress. The 3,933 Merit Scholar winners who entered college during 1956 and 1960 were followed up in 1965. This study concentrates on Scholars' own judgments of their progress toward their long-term objectives. Most Scholars express satisfaction with their progress, but some do not. What factors differentiate Scholars who are pleased with their progress from those who are not?

3. Progress of Merit Scholars: Does religious background matter? Merit Scholarship winners in 1956 and 1957 were followed up by questionnaire in both 1964 and 1965 to obtain information about the progress they had made in various areas (education, career, family) of their lives. Attention is focused on whether Scholars' religious background is related to their progress.

STUDIES OF TALENTED NEGRO STUDENTS

1. Five-year followup of participants in the first Achievement Program. Over four years have passed since the college entry of participants in the first Achievement Program, and many now have probably graduated. A followup questionnaire for this group is being developed for mailing to the 4,288 participants in the first Achievement competition. This group was surveyed in 1966 following the freshman year, so this followup is expected to complete a longitudinal description of the college careers of these students.

2. One-year followup of participants in the fourth Achievement Program. Followup data are being collected from participants in the fourth Achievement Program (1968). Information is being obtained regarding college attended, college progress, educational aspirations, and current major and career plans. These data will be used to describe the first-year college experiences of Achievement participants who entered the program either through nomination or test performance. In addition, there is a large set of precollege data available for the 2,846 Commended participants in this group. These data, together with the followup data, will be used to study the relationship of ability and biographical variables to the early career progress of able black students.

3. The entry of able black students into American colleges. Of the 2,587 Commended students in the first Achievement Program, 1,744 returned a followup questionnaire in the summer of 1966 and indicated that they had entered a four-year accredited college in the fall of 1965. The colleges they attended are to be classified into five general types: the public and the private predominantly Negro colleges and the low, moderate, and high selectivity predominantly white colleges. Using student characteristics obtained prior to college entrance, a descriptive analysis is being done of the characteristics of talented black students who entered these five types of colleges. First-year college experiences are also being contrasted for students in the different types of colleges.

STUDIES OF PARTICIPANTS IN THE NATIONAL TALENT SEARCH

1. A migration analysis of able students. The sample of this study consists of 51,096 students who scored in the top two percent on the 1966 administration of the National Merit Scholarship Qualifying Test (NMSQT). Migration is based on where students were born as compared with where they were tested. Twelve regions were identified in order to increase the stability of the results obtained.

2. Parental education as a determinant of the ratio of sons to daughters who obtain high scores on the NMSQT. The sample consists of 52,585 students who scored in approximately the top two percent on the NMSQT. The ratio of sons to daughters who get high NMSQT scores was investigated from the standpoint of different combinations of education completed by fathers and mothers.

3. Paternal influence on talent. A sample (N=127,125) of college freshmen was grouped by father's occupation. Fathers' occupations were then compared in terms of the probability of the sons and daughters having attained various types of achievements--scientific, leadership, oral, musical, artistic, and literary--in high school. This should provide data relevant to the question: Do sons and daughters excel in particular skills which the father uses in his occupation?

4. Student characteristics and NMSQT performance. Considerable data are obtained from the approximately 800,000 participants in the NMSQT program. The data include state in which high school is located, sex, high school grade average, NMSQT scores, career plans, source of school support, etc. The purpose of this study is to provide information about the participants in the NMSQT program.

5. The major investigation in progress at the present time is the College Attendance Study. Questionnaires were mailed to 35,000 Merit and Achievement participants in the 1967 NMSQT program. Students were selected on the basis of these factors: NMSQT score, sex, Merit or Achievement participant, and geographical location. Students were selected who scored within various ranges on the entire NMSQT score distribution. The one-page questionnaire focuses mainly on whether students entered college and, if so, where they went. Information is also being obtained about income, highest degree expected, type of

college entered, educational major plans in college, career plans, sources of financial support in college, freshman grade average, marital status, and several other areas. Various combinations of personal characteristics can be taken into account to determine the college attendance rates, types of careers chosen, etc. by whites and blacks.

6. The similarity of preferences of able students for highly selective colleges. This study will examine whether certain groups of colleges are likely to appear as both the first and second choices of 50,000 Commended students who took the NMSQT in 1966 will be cross-classified for the 200 most highly selective American colleges. These data will indicate the likelihood that students selecting one of the colleges as a first choice will select each of the others as a second choice. Using a statistical clustering technique, the association between first and second college choices will be analyzed to form groups of colleges. If college preferences are structured, each group will contain colleges likely to be preferred by certain groups of high ability students. An attempt will be made to identify the characteristics of students preferring different types of colleges.

CHARACTERISTICS OF ABLE STUDENTS

Holland, J. L., and Stalnaker, J. M. An Honorary Scholastic Award. Journal of Higher Education, 1957, 28, 361-368.*

In the middle of their freshman year in college, 3,085 Merit Commended students were sent a questionnaire asking what college they were attending, which college they would have preferred to attend, their probable college major, what scholarship awards they had received, and the significance to them of being a Certificate of Merit winner. A majority of these students were concentrated in a relatively few high-prestige colleges. Most were attending the college of their first choice; those who were discontented with their colleges were likely to be attending institutions relatively unpopular with Scholars and Commended students. 65% of the sample reported receiving scholarship offers. Scientific fields and engineering predominated among major field choices. The effects of winning the Certificate of Merit were generally considered to be positive.

Holland, J. L., and Stalnaker, Ruth C. A Descriptive Study of Talented High School Seniors: National Merit Scholars. The Bulletin of the National Association of Secondary School Principals, 1958, 42, 9-21.*

Screening methods employed for selecting the 1955-1956 National Merit Scholars are reviewed. The Scholars are characterized in terms of their geographical distribution, secondary school origin, and personality as revealed by their career choices, recreational and extracurricular activities, socioeconomic status, and life goals.

Thistlethwaite, D. L. How the Talented Student Evaluates his High School. School Review, 1958, 66, 164-168.

Evaluations of the quality of their high school instruction were made by 535 Merit Scholars at the end of their freshman year in college. On the whole they considered their high school instruction adequate, particularly in mathematics and chemistry. The Scholars were less satisfied with the instruction in English and the social sciences.

Holland, J. L. The Undergraduate Achievement of National Merit Scholars and Certificate of Merit Winners. The Bulletin of the National Association of Secondary School Principals, 1959, 43, 190-192.

The freshman grades of 1957 Merit Scholars were compared with those of the Commended group. Scholars obtained significantly higher grades on an overall basis and also when grades were studied by state or institutions.

Holland, J. L. A Comparison of National Merit Scholars and Certificate of Merit Winners. The Bulletin of the National Association of Secondary School Principals, 1960, 44, 140-142.

In a sample of 1,038 Merit Finalists, those who were selected as Merit Scholars were compared with those who were not. Data available included the SAT, NMSQT, CPI, VPI, and high school rank. There were few significant differences. Scholars had higher ability test scores.

Holland, J. L. The Achievement, Aptitudes, and Personalities of National Merit Scholars and Certificate of Merit Winners. The Bulletin of the National Association of Secondary School Principals, 1960, 44, 100-104.

924 Merit Finalists and Scholars were administered the 16 PF, the VPI, and the National Merit Student Survey; SAT scores and high school rank were also available. Scholars had higher SAT scores and high school ranks than Finalists. Male Scholars were more cheerful, less adventurous, less verbally active, less aggressive and had less control than did Finalists. Female Scholars were less radical and more self-sufficient than Finalists. Both groups scored above average on dominance, radicalism, self-sufficiency, achievement, and creativity.

Holland, J. L. Achievement Syndromes Among High Aptitude Students. Psychological Reports, 1961, 8, 384.*

Predictors of academic, creative, scientific, and artistic performance found in a previous study of 72 personal, demographic, and parental variables were factored using samples of 649 male and 345 female Finalists. Eleven factors were identified and interpreted.

Astin, A. W. Socioeconomic Factors in the Achievements and Aspirations of the Merit Scholar. Personnel and Guidance Journal, 1964, 42, 581-586.

Information about socioeconomic background, past achievements, and future plans was obtained from the freshman students enrolling at 248 colleges and universities. Among these 127,212 entering freshmen, the 334 students who had received Merit Scholarships were identified. The Scholars, when compared with the other students, tended to come from higher socioeconomic backgrounds, to achieve more frequently in both academic and creative fields, and to have more ambitious educational plans. Scholars are also more likely than the other students to be interested in careers as college professors or scientific researchers, and less likely to be interested in school teaching, business, and the professions. Additional comparisons using samples of matched subjects demonstrated that these differences between Scholars and nonscholars in their achievements and aspirations cannot be attributed to the Scholars' higher socioeconomic backgrounds.

Nichols, R. C., and Davis, J. A. Some Characteristics of Students of High Academic Aptitude. Personnel and Guidance Journal, 1964, 42, 794-800.

A group of 1,184 college seniors who had been Merit Semi-finalists at high school graduation were compared with a group of 3,397 college seniors selected to be representative of all graduating college seniors in the United States. Since the Merit students came from families of higher socioeconomic status, a subgroup of 323 Merit students was selected which was matched with the average group on five socioeconomic factors. The Merit students differed significantly from the average students on many aspects of personality, attitudes, interests, career plans, and family background. None of these differences were affected by the control of socioeconomic status. The results are discussed in terms of factors that may be related to the origin of intelligence and factors that seem to be the result of intelligence.

Nichols, R. C. The Parental Attitudes of Mothers of Intelligent Adolescents and the Creativity of their Children. Child Development, 1964, 35, 1041-1050.*

Childrearing attitudes of the mothers of 796 male and 450 female Merit Finalists were assessed with the Parental Attitude Research Instrument, which was scored for three factors: Authoritarian-Control, Hostility-Rejection, and Democratic Attitudes. The Merit Finalist children of these mothers were assessed with a variety of inventory scales, self ratings, interest and activity check lists, high school performance measures, and teacher ratings. Only the Authoritarian-Control factor had correlates exceeding chance expectancy. Authoritarian childrearing attitudes of the mother were negatively related to measures of the creativity and originality of the child, but were positively related to academic performance.

Nichols, R. C. The Financial Status of National Merit Finalists. Science, 1965, 149, 1071-1074.

A study of the family income of 12,418 students who were National Merit Finalists in 1964 shows that relatively few (about 2%) are from very poor families, but many (perhaps about one-fourth) would require financial aid to attend college. The financial status of Merit Finalists varies greatly from state to state. The ratio of the proportion of Merit Finalists is positively related to the state's per

pupil expenditure for education. The size of this relationship increases when the proportion of college graduates in the state is controlled. This finding is interpreted as supporting the hypothesis that increased expenditures for education raise the performance of talented students from poor families.

Blumenfeld, W. S. Some Characteristics of Finalists in the 1966 National Achievement Scholarship Program. NMSC Research Reports, 1966, 2, No. 4.

As part of the Scholar selection process of the 1966 National Achievement Scholarship Program, 1,029 Finalists completed a 94-item research questionnaire. The percentage of Finalists responding to each alternative of each item was obtained; in addition, a matrix of intercorrelations of 50 selected items was calculated. Described in terms of their item responses, the Finalists appeared to be high aspiring, high grade achievers, academically oriented, professional occupation oriented, high extracurricular achievers, active, interesting, and talented young people.

Nichols, R. C. Participants in the 1965 NMSQT. NMSC Research Reports, 1966, 2, No. 1.

794,589 eleventh grade students enrolled in 17,608 high schools took the National Merit Scholarship Qualifying Test in March 1965. Participating schools enrolled about 95% of all U. S. eleventh grade students. A series of tables shows the characteristics of participating students and schools by state and by percentage of a school's eligible students participating. The mean selection score of participating students for states varied from a low of 86.6 for South Carolina to a high of 110.9 for Iowa, a range of slightly more than one standard deviation. About 11% of participating schools tested all or about all of their eleventh grade students, while slightly more than 75% tested less than half.

Nichols, R. C. College Preferences of Eleventh Grade Students. NMSC Research Reports, 1966, 2, No. 9.

The 800,000 participants in the 1965 administration of the National Merit Scholarship Qualifying Test indicated the college they hoped to attend. Several indices were computed separately by sex to show the popularity of each college with students of various ability levels and with out-of-state students. Large institutions tended to be more popular with all groups of students than were small institutions. When popularity was adjusted for the number of students enrolled, the popularity indices for high and low ability students showed different patterns of correlations with other college characteristics. High ability students were attracted by affluent colleges and institutions where the environment is described as high in awareness and scholarship. Low ability students tended to be attracted by colleges with low tuition and colleges with environments characterized as high in practicality. Popularity with high ability students relative to size was correlated .87 with the number of applications received by a college from high ability students relative to the number of students accepted for admission. An Appendix lists the various popularity indices for 1,328 institutions.

Roberts, R. J., and Nichols, R. C. Participants in the National Achievement Scholarship Program for Negroes. NMSC Research Reports, 1966, 2, No. 2.

In the fall of 1964 all of the nation's secondary schools were invited by mail to nominate outstanding Negro students for participation in the first annual competition of the National Achievement Scholarship Program. A total of 1,280 schools nominated 4,288 students. A committee selected 629 Finalists and commended an additional 1,958 students. A second committee selected 224 Scholars from among the Finalists. The Scholars were awarded 4-year college scholarships with stipends from $250 to $1,500 per year depending on need. The objective of the program is to call attention to the most able Negro youth and to help financially as many to attend college as funds will permit. Among the findings in this study of the program are the following. 62% of the nominees were girls. The median vocabulary test score of the Finalists was at about the 93%-ile of all high school juniors. Achievement Finalists had high aspirations; their goals were generally higher than comparable groups of National Merit Finalists and much above those of average students. The median family income of Finalists was higher that that of all nonwhite families and was very similar to that of the total U. S. population. The parents of nominated students had more education than the nonwhite population of a similar age. Nominated students more frequently came from intact families than do members of the nonwhite population of the same age. Achievement Finalists tended to come from larger families than Merit Finalists do.

Nichols, R. C. The Origin and Development of Talent. Phi Delta Kappan, 1967, 48, 492-496.

The results of past and current studies conducted at NMSC are discussed in terms of their implication for three broad questions about talent: (1) What are the characteristics of talented students? (2) How can we foster the development of talent once it is identified? and (3) What is the origin of talent?

Werts, C. E. The Many Faces of Intelligence. Journal of Educational Psychology, 1967, 58, 198-204.

Data on a sample of 127,125 college freshmen were used to study the relationship between high school grade average and various types of extracurricular talent displayed during high school. In the scientific, literary, leadership, art, music, speech, and drama areas, the percentage of students with high grades in high school was greater than the percentage of students with low grades showing these talents. High grade students usually won recognition in several of these extracurricular areas, while most low grade students did not.

Blumenfeld, W. S. College Preferences of Able Negro Students. A Comparison of Those Naming Predominantly Negro Institutions and Those Naming Predominantly White Institutions. College and University, 1968, Spring, 330-341.

College preferences were expressed by 938 National Achievement Scholarship Program Finalists. The purpose of this program is to identify outstanding Negro high school students. The identification and selection procedure consisted of invited school nominations, committee screenings, further assessment, and committee decision. These Finalists are quite likely among the most academically able Negro students in the nation. As part of the selection process, the Finalists completed a research questionnaire containing their college preference (the college they hoped to attend) and other information--biographical, occupational interests, achievements, and activities. Relatively few (14%) of the Finalists indicated preference for a predominantly Negro college. Of those named, the most popular were prestigeful, e.g., Howard and Fisk. The predominantly white colleges named tended to be private and prestigeful colleges of the Northeast, e.g., Harvard and Radcliffe. The preferences for predominantly white colleges were more similar to the preferences of known groups of very able students, e.g., Merit Finalists, than to the preferences of college aspiring students in general. Preference for a predominantly Negro college was highly related to being a girl, coming from the South, and having a lower test score. When these three factors were controlled, analysis of the questionnaire indicated that the preference for a predominantly Negro college was also associated with a slightly lower socioeconomic background.

Kaplan, Rosalyn. Language Study of National Merit Scholarship Semifinalists. Foreign Language Annals, 1968, 2, 51-53.

A survey of the language courses taken in high school by National Merit Semifinalists indicated that French and Latin are the languages most frequently studied by these talented students. A majority of students studied more than one language and generally studied these for more than two years. The "brighter" the student, the more languages and number of years studied. The higher the academic quality of the high

school, the more languages studied and these for a greater length of time. Girls study more years of languages and a greater number of different languages than do boys.

Nichols, R. C. Heredity, Environment, and School Achievement. Measurement and Evaluation in Guidance, 1968, 1, 122-129.*

Dr. Nichols suggests that there are three main factors or types of variables that seem likely to have an important influence on ability and school achievement. These are (a) the school factor or organized educational influences; (b) the family factor or all of the social influences of family life on a child; and (c) the genetic factor. Relevant research findings are discussed in connection with each of these three factors.

Werts, C. E. A Comparison of Male vs. Female College Attendance Probabilities. Sociology of Education, 1968, 41, 103-110.

Boys (N=76,015) and girls (N=51,110) entering 248 colleges were compared on father's occupation and high school grade averages. Father's occupation was taken as an indication of socioeconomic status (SES) and secondary school grade average as an index of ability. Among low ability students, boys were much more likely to enter college than girls, while high ability boys and girls were equally likely to enter college. Among low SES students, boys were much more likely to enter college than girls, while boys and girls whose fathers were closely associated with the academic community were similar in college attendance rates.

Burgdorf, K. Outstanding Negro High School Students: A One-Year Followup. NMSC Research Reports, 1969, 5, No. 4.

One year after their expected date of graduation from high school, all of the participants in the first National Achievement Scholarship Program for outstanding Negro students were asked to fill out a questionnaire dealing with their college experiences. Data from this questionnaire were analyzed to assess the extent to which the program accomplished its dual objectives of encouraging talented Negro students to attend college and of encouraging colleges to seek talented Negro students. The results were generally in the expected direction: students in the higher competition groups were more sought after by the colleges, they were more successful in college entrance, they had more nonacademic achievements, etc. However, most of the differences were small, not so much because students in the higher competition status groups did poorly in college as because students in the lower status groups did well. A followup of a random group of nonrespondents to the original followup indicated that sampling bias in the original followup acted to depress competition status group differences, but not substantially.

Nichols, R. C. Where the Brains Are. NMSC Research Reports, 1969, 5, No. 5.

An index of the concentration of talented students in the various Standard Metropolitan Statistical Areas of the U. S. was developed from the 1966 administration of the National Merit Scholarship Qualifying Test. Correlations of this index with other characteristics of the metropolitan areas revealed that talented students tend to be concentrated in areas with large populations that are economically well off and have a high educational level, a high proportion of foreign born, a low proportion of nonwhites and low fertility.

PROGRESS OF SCHOLARS

Nichols, R. C., and Astin, A. W. Progress of the Merit Scholars: An Eight-Year Followup. Personnel and Guidance Journal, 1966, 44, 673-686.

The 3,106 Merit Scholars appointed in the first four years of the National Merit Scholarship Program (1955-1959) were followed up in 1964. 95% of the 1956 group had received their bachelor's degrees, but this percentage decreased to 84% for the 1959 group because many take more than four years to finish college. Almost all Scholars planned eventually to get a college degree. Of those who have received bachelor's degrees 87% of the boys and 69% of the girls have entered a graduate or professional school. Most Scholars were still in school or in temporary jobs and have not yet entered their career fields; yet a number have made significant achievements, particularly in scientific and artistic fields. Over two-thirds of the Scholars have made major changes in their career plans since entering college. These changes reduced the proportion of Scholars planning careers in scientific research and engineering, initially the most popular fields, and increased the range and diversity of career choices.

Watley, D. J. Career Progress: A longitudinal Study of Gifted Students. Journal of Counseling Psychology, 1969, 16, 100-108.

This study had two main purposes: (a) to assess the variability in career progress made by highly gifted students 7 to 8 years after they entered college; and (b) to identify factors that possibly contributed to the differential progress found. A total of 1,014 male and 368 female Merit Scholars were studied. Followup data indicated that the Scholars of both sexes differed markedly in the level of education achieved. These differences did not appear to be due to unequal scholastic ability or to differential high school achievement. Factors pertaining to family background and Scholar personality characteristics appeared to be related to the level of education attained.

Watley, D. J. Career or Marriage?: A Longitudinal Study of Able Young Women. NMSC Research Reports, 1969, 5, No. 7.

Women who won National Merit Scholarships during the years 1956 through 1960 were followed up in 1965 to determine their marriage and/or career plans. Each of the 883 women was classified into one of five groups: Marriage only, marriage with deferred career, marriage with immediate career, career only, or uncertain. The educational and career field aspirations of these groups differed; and those seeking an immediate career scored higher on scholastic ability tests than those who either planned no career or who planned to delay entering them. The groups also differed in their willingness to express problems encountered in making and implementing their plans and problems experienced because of being a woman.

THE MERIT PROGRAM

Stalnaker, J. M. Principals Evaluate the National Merit Scholarship Program. The Bulletin of the National Association of Secondary School Principals, 1958, 42, 22-24.*

234 high school principals were asked to evaluate the National Merit Scholarship Program. Most evaluations were favorable, especially in regard to the way the program increased the scholastic motivation of high school students.

Stalnaker, J. M. Recognizing and Encouraging Talent. American Psychologist, 1961, 16, 513-522.

The 1960 Walter van Dyke Bingham Memorial Lecture. A discussion of the goals, methods, and effects of the Merit Program, and their implications for the conservation of talent.

Stalnaker, J. M. Psychological Tests and Public Responsibility. American Psychologist, 1965, 20, 131-135.*

A discussion of the ways in which an awareness of public responsibility has shaped the Merit Program.

SCHOLARSHIPS AND THE CONSERVATION OF TALENT

Thistlethwaite, D. L. College Scholarship Offers and the Enrollment of Talented Students. Journal of Higher Education, 1958, 29, 421-425.*

Scholarship offers from other agencies to 1,603 Merit Finalists and Commended students were studied. The institutions offering many high-value scholarships were generally the most successful in attracting these high-aptitude students. Other factors that were positively related to the students'

college choices were size of library and location in the East North Central part of the U. S.

Thistlethwaite, D. L. The Conservation of Intellectual Talent. Science, 1958, 128, 822-826.

Enrollment vs. nonenrollment in college in the fall after graduation from high school was studied using a sample of 19,945 National Merit Scholars, Finalists, and Commended students. The percent not in college was less than one-half the lowest previous estimate (0.2% for Scholars, 3.1% for Finalists, 5.1% for Commended). Over half the non-winners who were not in college stated that finances were the main obstacle to continuing their educations. The differences between the nonwinners who enrolled in college and those who did not were studied. Parental encouragement to attend college and vocational aspirations requiring a college degree had the strongest positive influence on subsequent college enrollment.

Thistlethwaite, D. L. Scholarships and the College-Going Behavior of Talented Students. College and University, 1958, 34, 65-73.*

Responses of 535 Merit Scholars to a questionnaire at the end of their freshman year in college show that over half felt the Merit Scholarship encouraged them to attend a higher-prestige college. Shifts in major field between the senior year in high school and the end of the freshman year in college show the Scholars going out of scientific areas into the humanities, especially history.

Thistlethwaite, D. L. Counseling High-Aptitude Students on Scholarship Opportunities. Personnel and Guidance Journal, 1959, 37, 574-577.

The success of scholarship applications to other agencies of 6,276 Commended students and Finalists who did not become Merit Scholars in the 1957 Merit Program was studied. Those who won scholarships applied for a larger amount of scholarships and made applications to the less popular colleges. They also took relatively more mathematics courses while in high school.

Thistlethwaite, D. L. Effects of Social Recognition Upon the Educational Motivation of Talented Youth. Journal of Educational Psychology, 1959, 50, 111-116.

An ex post facto comparison was made of the educational motivation of two groups of talented students receiving different amounts of social recognition for their performances in the National Merit Scholarship competition. Increased recognition increases the number of students planning to seek the PhD or MD degree, the number planning to become college teachers or scientific researchers, and the favorableness of attitudes toward intellectualism. These trends were particularly strong among students whose fathers were employed in nonprofessional occupations and among students with only moderately high verbal aptitudes.

Thistlethwaite, D. L. Merit Scholarships and the Higher Education of Gifted Students. Journal of Higher Education, 1959, 30, 295-304.*

The effect of winning a Merit Scholarship on college attendance were studied using a sample of 194 pairs of Finalists and Commended students matched with Merit Scholars on sex, SAT scores, percentile rank in high school class, and family financial status. Merit Scholarships increase attendance at the students' first-choice colleges (especially private colleges and all-male or all female institutions), and they positively influence the motivation to receive training. These influences are more marked for students from low income families.

Holland, J. L., and Kent, Laura. The Concentration of Scholarship Funds and its Implications for Education. College and University, 1960, 35, 471-483.

The distribution of scholarship funds at colleges and universities was studied with special emphasis on the per-pupil scholarship funds available at various institutions. Scholarship awards at the higher prestige (and expense) institutions are mostly given to students whose parents make above-average income. The significance of these findings is discussed.

Thistlethwaite, D. L., and Campbell, D. T. Regression-Discontinuity Analysis: An Alternative to the Ex Post Facto Experiment. Journal of Educational Psychology, 1960, 51, 309-317.

This paper presents and illustrates a method of testing causal hypotheses, called regression-discontinuity analysis, for situations where the investigator is unable to assign subjects randomly to experimental and control groups. It compares the results obtained by the new mode of analysis with those when an ex post facto design was applied to the same data. The new analysis suggests that public recognition for achievement on college aptitude tests tends to increase likelihood that the recipient will receive a Scholarship, but did not support the inference that recognition affects student attitudes and career plans.

Holland, J. L. Dangers in Our Scholarship Policies. Teachers College Record, 1961, 62, 326-328.*

A discussion of various prejudices accepted without question by those who choose scholarship winners.

Thistlethwaite, D. L. The Recognition of Excellence. College and University, 1961, 36, 282-295.*

The effects of the social recognition accompanying status as a Commended student in the Merit Program were studied. One year after graduation from high school 5,927 Commended students in the 1958 program estimated the effects of this recognition. They reported that it had significantly increased their self-confidence (particularly among those with comparatively low high school ranks), helped them get admitted to preferred colleges, and helped them win scholarships.

Holland, J. L., and Astin, A. W. The Need for Re-defining "Talent" and "Talent Loss": A Plan for Practical Action and Research. Journal of Higher Education, 1962, 33, 77-82.

The ambiguity of the terms "talent" and "talent loss" is discussed and definitions are proposed for both terms. "Talent" should be considered as the individual's potential for performing something of value to himself and society; "talent loss" results when talented persons fail to perform work at a level commensurate with their potential.

Stalnaker, J. M. Scholarship Selection and Cultural Disadvantage. The Bulletin of the National Association of Secondary School Principals, 1965, 49, 142-150.

Mr. Stalnaker discusses the rationale for establishing the National Achievement Scholarship Program for Negroes. He points out the major reasons for this program as well as some criticisms that have been raised against it. The procedure is described that was used in selecting the first group of Achievement Scholars.

Crawford, N. C., Jr. Effects of Offers of Financial Assistance on the College-Going Decisions of Talented Students with Limited Financial Means. NMSC Research Reports, 1967, 3, No. 5.

A group of 1,545 Merit Finalists with high financial need were followed up approximately two years after high school graduation. Those who received offers of financial aid (from National Merit or any other source) were more likely to enter college, were more likely to attend a private institution, and were more likely to persist in college than were the students who did not receive offers of financial aid.

Stalnaker, J. M. Recruiting for Career Potential. In J. J. Donovan (Ed.), Recruitment and Selection in the Public Service, Chicago: Public Personnel Association, 1968, 100-111.*

Mr. Stalnaker discusses the problem of the recruitment of potential executive and administrative talent. The college graduate is not a uniform product. Selection from among them should concern not only the grade and the test record but other evidences of interest and ability. A variety of

types of personality are capable of success in the executive branches and diversity should be favored.

PREDICTION OF PERFORMANCE

Holland, J. L. The Prediction of Scholastic Success from a High Aptitude Sample. School and Society, 1958, 86, 290-293.*

The predictive validity of various selection and background variables was studied using a sample of 556 Merit Scholars after one year of college. SAT scores and high school rank were the most reliable predictors of college grades. Efficiency of the predictors was increased by studying more homogeneous groups of students--e.g., those attending the same college, or those with scientific vs. those with nonscientific orientations. Validities were higher for males than for females.

Holland, J. L. The Prediction of College Grades from the California Psychological Inventory and the Scholastic Aptitude Test. Journal of Educational Psychology, 1959, 50, 135-142.*

First-year college grades were intercorrelated with the CPI and SAT using a sample of 1,321 Merit Finalists. The student sample was classified in three different ways. First, zero-order and multiple correlations were computed for a part of the sample and cross validated on the other part. Second, correlations were computed separately for the 8 colleges enrolling more than 24 students. The CPI was generally a more effective predictor than the SAT in this highly selected sample. The results showed great variation from college to college.

Holland, J. L. Some Limitations of Teacher Ratings as Predictors of Creativity. Journal of Educational Psychology, 1959, 50, 219-223.

The average intercorrelations of 12 teacher rating scales were .64 for 783 male and .59 for 394 female Merit Finalists. The ratings on maturity, selected as the most representative were correlated with a variety of personality, achievement, and background variables. The highest correlations were with academic achievement (.35). The results are discussed in relation to the findings from other studies. Only a limited reliance on teacher ratings as predictors of creativity appears desirable.

Holland, J. L. The Prediction of College Grades from Personality and Aptitude Variables. Journal of Educational Psychology, 1960, 51, 245-254.*

First-year college grades of 952 Merit Finalists were correlated with SAT scores; high school rank; the 16PF; the NMSS, a personality inventory constructed from a review of the literature; and the VPI, a personality inventory consisting of occupational titles. The results suggest that nonintellectual variables such as Superego, Persistence, and Deferred Gratification are useful in prediction of grades and in understanding the nature of the academic achiever. An empirical explanation for the overall superiority of HSR as a predictor of college grades in this study was provided by correlating the aptitude, teacher rating, and nonintellectual variables with HSR. Student samples attending colleges with different atmospheres in terms of PhD productivity and student and faculty press as measured by the CPI variables were also studied, and it was found that colleges with different atmospheres reward different kinds of students.

Holland, J. L. Creative and Academic Performance Among Talented Adolescents. Journal of Educational Psychology, 1961, 52, 136-147.

The relationships between three criteria of academic and creative performance and 72 personal, demographic, and parental variables were studied in a sample of 994 Merit Finalists. The results suggest that creative performance at the high school level occurs more frequently among students who are independent, intellectual, expressive, asocial, consciously original, and who have high aspirations for future achievement. Students who are persevering, sociable, responsible, and whose parents hold somewhat authoritarian attitudes and values, are more frequently academic achievers. The negligible relationships found between academic aptitude and creative performance at a high aptitude level suggest that we need to use nonintellectual criteria in the selection of students for scholarships and fellowships.

Holland, J. L., and Astin, A. W. The Prediction of Academic, Artistic, Scientific, and Social Achievement of Undergraduates of Superior Scholastic Aptitude. Journal of Educational Psychology, 1962, 53, 132-143.

Undergraduate achievement in academic, artistic, scientific, and social areas was predicted from extensive assessments in the high school senior year for four independent samples of high aptitude students (N ranged from 354-953) over intervals of 1-4 years. The criteria of college achievement included grades, checklists of unusual accomplishments in science and art (e.g., publications, winning public recognition through awards and prizes), and election to student offices. Predictors included: scholastic aptitude, personality, originality, interest, parental attitude variables, and background information. Correlational analyses indicated that achievers in each of the four areas resemble our stereotypes of the scientist, artist, leader, and academic achiever.

Holland, J. L. The Nature of Student Achievement: A Summary and Model for Research and Practice. In Creativity: Its Assessment and Measurement. Los Angeles: Educational Testing Service, 1962.*

Current knowledge about student achievement is discussed and some formulations or models for understanding the information about student achievement are presented. The implications of these formulations for research and practice are outlined.

Nichols, R. C., and Holland, J. L. Prediction of the First Year College Performance of High Aptitude Students. Psychological Monographs, 1963, 77 (7, Whole 570).*

Predictors of academic achievement and extracurricular achievements in science, art, writing, dramatics, music, and leadership during the first year in college were studied using a sample of 1,033 Merit Finalists. Potential predictors included aptitude scores, originality scales, self-ratings, life goals, personality and interest scales, home background variables, and child rearing attitudes of the students' parents. The zero-order and multiple correlations between predictors and criteria are presented and discussed. The findings reveal a number of nonintellective predictors of the college achievement criteria.

Holland, J. L. The Selection of Students for Special Scholarships. Journal of Higher Education, 1964, 35, 32-37.

This is a study of 64 winners of special scholarships, who were appointed because they showed exceptional promise in a creative field, were admitted to college before graduation from high school, showed exceptional achievement in a specific area, or demonstrated exceptional motivation to continue their educations in spite of severe disadvantages (financial or otherwise). These students were followed up at the end of their freshman year in college, and were compared with 908 Commended students. Except for the disadvantaged students, all groups of the special Scholars had higher grades than the Commended group. The "creative promise" group had markedly more artistic accomplishments than the other groups.

Holland, J. L., and Nichols, R. C. The Predictions of Academic and Extracurricular Achievement in College. Journal of Educational Psychology, 1964, 55, 55-65.

Achievement in college of a group of 1,473 Merit Finalists was predicted from an assessment of their interests, goals, actions, self-concepts, aptitudes, and personality traits. Criteria of achievement included grades and checklists of accomplishments in art, science, leadership, music, dramatic arts, and writing. Cross-validation of results revealed that records of past achievement and Potential Achievement

Scales developed from everyday activities and interests were generally superior to other kinds of variables and equalled the efficiency of the best multiple-regression equations.

Nichols, R. C., and Holland, J. L. The Selection of High Aptitude High School Graduates for Maximum Achievement in College. Personnel and Guidance Journal, 1964, 43, 33-40.

Nine alternative methods were used to select groups of 200 students from a total sample of 587 Merit Finalists. Conclusions were (a) Additional selection on aptitude using either the same or a different test does not appreciably improve selection for high-level college performance, (b) Selection on the basis of high school rank produces students who demonstrate superior academic performance but not necessarily other kinds of achievement, (c) Selection on the basis of a broad range of high school achievements results in a broad range of achievement in college without lowering the level of academic performance, (d) Addition of personality and interest variables to the high school achievement measures decreases selection efficiency. A selection committee appears to be less effective than the best objective methods in identifying students with potential for extracurricular achievements in college.

Kirchner, J. H., and Nichols, R. C. The Utility of Counselor, Teacher, Peer, and Self Ratings for the Prediction of Student Behavior. Journal of Counseling Psychology, 1965, 12, 192-195.

Ratings on 32 personality traits by various categories of raters were correlated with 19 behavioral criteria in samples of 104 and 360 Merit Finalists. There were no significant differences between categories of raters in the degree to which their ratings were related to the criteria. The relationships between ratings and criteria for all groups of raters were low, but significant.

Roberts, R. J. Prediction of College Performance of Superior Students. NMSC Research Reports, 1965, 1, No. 5.

Scales were developed to predict first year college grades and extracurricular achievement in science, writing, music, art, speech, and leadership by analysis of 906 precollege questionnaire items using 857 male National Merit Finalists and Commended students. Two item analysis strategies were used: (a) responses of achieving Ss and general samples of nonachieving Ss were compared; (b) responses of achieving and nonachieving Ss who had previously indicated desire to achieve were compared. The two strategies did not yield essentially different scales. Validity coefficients ranged from .15 to .38 in a sample of 300 cross-validation Ss; similar correlations were obtained in a sample of 681 female Ss. A greater proportion of the items about past accomplishment, activities, and competencies entered the scales than was the case for other item types. Inferences about the characteristics of achievers in the various areas were made from the content of the scales and their intercorrelations.

Nichols, R. C. Nonintellective Predictors of Achievement in College. Educational and Psychological Measurement, 1966, 26, 899-915.

Scales for predicting first year college grades and extracurricular achievement were developed by item analysis from each of four item pools (the California Psychological Inventory, CPI; the Vocational Preference Inventory, VPI; an Adjective Check List, ACL; and an experimental Objective Behavior Inventory, OBI) using a sample of 1,013 National Merit Finalists. The scales were cross-validated using samples of 179 male and 138 female Merit Finalists and 201 male and 218 female students of average ability. The CPI and OBI scales had higher validities than those developed from the ACL and VPI. The best predictor of college grades was rank in high school class (HSR) followed by the nonintellective grade scales and finally by aptitude test scores. The nonintellective scales added to the prediction of grades in a regression equation including HSR and test scores. The best predictors of extracurricular achievement were the nonintellective achievement scales. Test scores and HSR did not add to the prediction of extracurricular achievement in a regression equation including the nonintellective scales.

Watley, D. J. Do Counselors Know When to Use Their Heads Instead of the Formula? Journal of Counseling Psychology, 1968, 15, 84-88.

Two questions were investigated: (1) Does a general kind of validation experience improve the accuracy of clinical judgments? (2) Do clinical judges know when to use their heads instead of the formula? These questions were studied using judges known to predict educational criteria at relatively high, moderate, and low levels of accuracy. The results revealed that the accuracy of predictions of freshman and overall college grades did not improve after the validation experience; in fact, some evidence showed a decrease in accuracy. Further, the judges were clearly unable to improve predictive accuracy by attempting to recognize when to deviate from the formula.

Watley, D. J. The Effects of Feedback Training on Accuracy of Judgments. Journal of Counseling Psychology, 1968, 15, 167-171.

Opinions differ about the best method for training judges to make clinical forecasts. Some evidence suggests, however, that judgments are more likely to improve under prediction conditions that are precisely defined. This study assessed the effect of providing immediate feedback training to judges known from a previous study to predict educational criteria at relatively high, moderate, or low levels of accuracy. The criteria predicted were freshman and overall college grades. In comparison with judges who received no training, the forecasts of "low" accuracy judges showed substantial improvements for both predicted criteria; however, the training had no noticeable affect on the judgments of the "high" or "moderate" accuracy judges.

Watley, D. J. Reply to McArthur: Lost by Praeteritio? Journal of Counseling Psychology, 1968, 15, 390-392.

McArthur had commented on a paper by Watley entitled: Feedback Training and Improvement of Clinical Forecasting." This reply deals with the question of research strategy and clinical predictive accuracy.

CHARACTERISTICS OF COLLEGES

Holland, J. L. Student Explanations of College Choice and Their Relation to College Popularity, College Productivity, and Sex Differences. College and University, 1958, 33, 313-320.*

The popularity of various colleges with a sample of 7,500 Merit Finalists was related to the status, size, lack of religious affiliation, liberal arts orientation, and coeducational status of the institution. College choice was also influences by the socioeconomic status and personal needs of the subject. Men typically chose schools close to home with good physical facilities, while women were more frequently attracted to small, coeducational, religious schools with good academic standing.

Holland, J. L. Determinants of College Choice. College and University, 1959, 35, 11-28.*

Questionnaires asking about college choice were sent to a sample of Merit Scholars and Commended students and their parents (1,416 families). Both students and parents regard the reputation of the college as an indication of the quality of the school. Students reported that their college choices were positively influences by the institution's popularity, the number of scholarships offered, and private (vs. public or religious) control.

Holland, J. L. Parental Expectations and Attitudes About Colleges. College and University, 1959, 34, 164-170.*

The parents of 1,416 Merit Scholars and Commended students answered a questionnaire designed to find out what college they considered the best in the U. S. and what they consider the attributes of the ideal college. Rankings of the "best"

colleges were the same for parents of Scholars and Commended students, and seemed unaffected by the college preferences of their children. The parents thought the ideal college should be small, have a good faculty and a good student-faculty ratio, and should be oriented toward the liberal arts.

Astin, A. W., and Holland, J. L. The Environmental Assessment Technique: A Way to Measure College Environments. Journal of Educational Psychology, 1961, 52, 306-316.

The Environmental Assessment Technique (EAT) consists of eight characteristics of the student body: size, average intelligence, and six "personal orientations" derived from student major fields. The six personal orientations, obtained from a census of the students' major fields at each institution, are shown to be highly stable over time. Correlations of the EAT with the College Characteristics Index using a sample of 36 colleges are presented. Some of the advantages, limitations, and possible applications of the EAT are discussed.

Astin, A. W., and Holland, J. L. The Distribution of "Wealth" in Higher Education. College and University, 1962, 37, 113-125.

The distribution of finances and student talent among 340 major colleges and universities was studied. Private institutions with high endowment funds enroll students who are more highly motivated and of greater ability, and greater proportions of their faculties hold doctorates than is the case among the low endowment private institutions. The highly endowed institutions receive more income from gifts, appropriations, and research contracts, have available more money for scholarships and fellowship awards, and charge higher tuition fees. When public institutions are separated into "highs" and "lows" on the basis of their general educational income per student, comparable differences are found for them. Some of the inequalities in the distribution of money and gifted students were considerable, two of the greatest being the rate of enrollment of Merit Scholars and the amount of income from research contracts. Gaps in financial resources have widened during the past four years, especially among private institutions. Implications of these findings are discussed.

Astin, A. W. An Empirical Characterization of Higher Educational Institutions. Journal of Educational Psychology, 1962, 53, 224-235.

A factor analysis of 33 major attributes of colleges was performed on 335 institutions. Attributes studied included traditional "type" characteristics (e.g., Religious vs. nondenominational), financial resources, measures of faculty and student characteristics, and measures of college "environment." The six principal dimensions along which institutions appear to differ were identified as: Affluence (wealth), Size, Private (vs. Public), Masculinity (vs. Femininity), Realistic (Technical) Emphasis, and Homogeneity. Affluence, which accounted for the largest proportion of variance, had high loadings from measures of the college's financial resources, student quality, faculty quality, and certain environmental characteristics.

Astin, A. W. Further Validation of the Environmental Assessment Technique. Journal of Educational Psychology, 1963, 54, 217-226.

Environmental Assessment Technique (EAT) measures were computed for 76 colleges and universities from published data about size, intelligence level, and major fields of study for the students at each institution; validation data were obtained from seniors. Eighteen items on a questionnaire completed by the seniors described their college environments and 21 items described the perceived "effects" of four college years. Mean responses to 14 of the 18 college environment items were significantly related to EAT variables in the predicted direction; 15 of 21 perceived effects of college were significantly related to at least one EAT variable. Student intelligence accounted for a larger proportion of variance in the validation items than any other EAT variable.

Astin, A. W. Some Characteristics of Student Bodies Entering Higher Educational Institutions. Journal of Educational Psychology, 1964, 55, 267-275.

The fall 1961 freshman classes at 248 colleges and universities were surveyed to determine some of the major distinguishing characteristics of entering student bodies. 127,212 students provided information on their academic and extracurricular achievements in high school, their educational and vocational aspirations, and on socioeconomic level. A factor analysis, by institution, of 52 student input variables revealed six major distinguishing characteristics of entering classes: Intellectualism, Estheticism, Status, Leadership, Masculinity, and Pragmatism. Weighted combinations of the highest-loading input variables yielded six relatively independent scores which correlated highly with their respective factors.

Astin, A. W. Distribution of Students Among Higher Educational Institutions. Journal of Educational Psychology, 1964, 55, 176-187.

Characteristics of entering freshman classes were found to be highly related to certain characteristics of the college. In general the aspirations of the entering students appear to be well suited to the curricular offerings of the institution. Private nonsectarian institutions tend to recruit student bodies with greater potential for academic, scientific, artistic, and social achievement than do other types of institutions. Multiple-regression analyses indicated that five of six freshman input factors (Intellectualism, Estheticism, Status, Masculinity, and Pragmatism) can be estimated with substantial accuracy (median cross-validated R=.85) from known characteristics of the institution.

Astin, A. W. College Preferences of Very Able Students. College and University, 1965, 41, 282-297.

This study examined the college preferences of a national sample of 120,458 high school students commended in the Merit Program. The "Popularity" of each of 1,013 accredited 4-year colleges and universities was defined as the total number of these students who named the institution as either their first or second choice. Institutional "Selectivity" was estimated by expressing Popularity as a percentage of the total number of freshmen admitted. Popularity was most closely related to the size of the institution. The university was the most popular type of institution with these highly able students, and the teachers college and liberal arts college the least popular. Estimated Selectivity was highly related to the institution's per student operating budget. Private institutions and universities tended to be the most selective types; teachers colleges tended to be the least selective. Estimated Selectivity was also found to be an accurate estimate of the average academic ability of entering students. The relative Popularity and Estimated Selectivity of the institution were found to be highly stable over intervals of one and two years, particularly among the higher-scoring institutions; Estimated Selectivity was slightly less stable than Popularity.

Astin, A. W. Who Goes Where to College? Chicago: Science Research Associates, 1965.*

Factor analyses of mean student characteristics at 246 colleges obtained from questionnaire responses of 127,212 entering freshmen at these institutions are reported. Since it was found that most of the major characteristics of the entering class can be estimated with considerable accurary from available data about institutions, it was possible to obtain estimates of the characteristics of entering freshmen at 1,015 accredited 4-year institutions in the U. S. Five estimated student input characteristics, as well as the 8 scores from the Environmental Assesssment Technique (EAT), are given in normalized standard score form for each of the 1,015 institutions. Some of the possible uses of the data in educational research, administration, and guidance are discussed.

Astin, A. W. The Classroom Environment in Different Fields

of Study. Journal of Educational Psychology, 1965, 56, 275-282.

To determine whether differences in the classroom environment of college courses are related to field of study, ratings of introductory undergraduate courses in 19 fields by 4,109 students were used. Differences among the 19 fields were significant on all 35 classroom characteristics. An inverse factor analysis of the 19 fields yielded three bipolar factors: Foreign Languages vs. Social Sciences, Natural Sciences vs. English and Fine Arts, and Business vs. History. These findings lend support to the hypothesis that the college environment is affected by the relative concentration of students and faculty in various fields of study.

Astin, A. W. The Introductory College Course in Psychology: An Empirical Analysis. Psychology in the Schools, 1965, 2, 309-317.

A factor analysis of 35 characteristics of the classroom environment obtained from ratings of introductory courses in 19 fields by 4,109 students yielded three factors: Extraversion of the Instructor, Class Participation and Interaction, and Structure. Psychology classes ranked lowest of all 19 courses on Class Participation and Interaction. Psychology was also more likely than other courses to be seen as a "bluff" course. Psychology professors were more likely than other professors to give "objective" tests, to be engaged in research, and to be judged as having a good sense of humor. Psychology professors were less likely to be judged as well-grounded in the subject matter of the course. Although psychology classes also tended to be somewhat larger than average, partialing on class size did not appreciably alter these findings.

COLLEGE EFFECTS

Holland, J. L. Undergraduate Origins of American Scientists. Science, 1957, 126, 433-437.*

An analysis of the college attendance or college choice for four high-aptitude high school senior samples suggests that the different institutional productivity of scientists and scholars is a function of the different college attendance, paternal vocational motivations, and their implied correlates among high-aptitude students. This formulation appears to be more probable for males than for females. The institutional productivity hypothesis proposed in previous studies is not supported by the present evidence.

Thistlethwaite, D. L. College Press and Student Achievement. Journal of Educatbnal Psychology, 1959, 50, 183-191.*

The College Characteristics Index was administered to 916 Merit Scholars and Certificate of Merit winners at 36 colleges. These data were correlated with college productivity, as measured by percent of alumni earning the doctorate. Colleges highly successful in encouraging doctorates in humanistic fields are characterized by excellent social science faculty resources, flexible curricula, energetic and controversial instruction, and warm, informal faculty-student contacts. High natural science productivity is related to absence of outstanding social science faculties and resources, nondirective teaching, toleration of violation of rules, and warm, informal faculty-student contacts. Hours of study are related to productivity in the humanities but not in the social sciences.

Thistlethwaite, D. L. College Environments and the Development of Talent. Science, 1959, 130, 71-76.*

A method for comparing the effectiveness of undergraduate colleges in stimulating their students to seek the PhD is described. The procedure yields separate measures of productivity in the natural sciences and in the arts, humanities, and social sciences, adjusted to control differences in college talent supplies. The results suggest the productivity measures have substantial validity and argue for the importance of faculty behaviors in stimulating or inhibiting intellectual achievement.

Thistlethwaite, D. L. College Press and Changes in the Study Plans of Talented Students. Journal of Educational Psychology, 1960, 51, 222-234.*

A followup study of 1,500 talented students at the end of their third year in college showed that: (a) Natural Sciences retained more talented students than biological sciences. (b) Faculties which the students perceived as enthusiastic, warm, and informal in their relationships with students and as stressing achievement, humanism, and independence, were associated with student changes to advanced training in the arts, humanities, and social sciences. Faculties perceived as enthusiastic and as not pressing for compliance were associated with changes to advanced training in natural and biological sciences.

Thistlethwaite, D. L. Honors Programs and Motivation to Seek Advanced Training. The Superior Student, 1961, 4, 16-18.*

At the end of the sophomore year in college 201 Merit Finalists who had participated in honors programs at their colleges were compared with 722 who had not. Significantly more of the honors program participants planned graduate study.

Astin, A. W. A Re-examination of College Productivity. Journal of Educational Psychology, 1961, 52, 173-178.

The PhD-producing rates of 36 colleges studied previously were subjected to further study. A college's productivity rates are related to characteristics of its entering students beyond their academic ability, namely, the percentage planning to major in natural science and the percentage aspiring to the PhD degree. When the effects of these two input variables are partialed out, correlations previously obtained between college press and productivity rates are reduced considerably.

Astin, A. W. Influences on the Student's Motivation to Seek Advanced Training: Another Look. Journal of Educational Psychology, 1962, 53, 303-309.*

Thistlethwaite's study, which interpreted certain college "presses" as influencing the student's motivation for advanced training, was re-examined. His method of controlling the student's initial level of educational aspiration--the analysis of covariance--was thought to be inappropriate, primarily because of anomalies in the correlation between initial and final levels of aspiration. In addition, the estimate of initial level of aspiration which had been obtained retrospectively from the Ss was judged to be too undependable for use as a measure of initial level of aspiration. Reanalyses of some of the data failed to support the author's original hypotheses about the "effects" of press on student motivation. Methodological problems in studying the influence of college environments on the student were discussed.

Astin, A. W. "Productivity" of Undergraduate Institutions. Science, 1962, 136, 129-135.*

A new method for evaluating the PhD productivity of undergraduate institutions was applied to a sample of 265 institutions. It was found that a college's actual PhD output can be predicted relatively accurately from an "expected" output based on the sex, major fields, and intelligence level of its students. Public institutions were found to be significantly overproductive, and eastern men's colleges and universities were found to be significantly underproductive of PhD's. Previous findings indicating the faculty had a causative effect on productivity were not confirmed. These results suggest that PhD productivity may not be a sensitive measure of the effectiveness of undergraduate institutions.

Astin, A. W. Differential College Effects on the Motivation of Talented Students to Obtain the PhD. Journal of Educational Psychology, 1963, 54, 63-71.

An attempt was made to differentiate college effects on the student's motivation to seek the PhD. An input-output design for controlling differential student input was applied to a 4-year longitudinal study of 6,544 high aptitude students. PhD aspiration appears to be negatively related to size of the student body, the percentage of males in the student body, and the Conventional Orientation in the college environment. Social Orientation also affected PhD aspiration significantly, but the relationship was very complex. Attending a coeducational liberal arts college appears to increase the student's motivation to seek the PhD, whereas PhD aspiration tends to be reduced by the northeastern men's colleges.

Astin, A. W. Undergraduate Institutions and the Production of Scientists. Science, 1963, 141, 334-338.

A 4-year longitudinal study of 6,254 Merit Finalists attending 82 undergraduate institutions studied the effects of different college characteristics on the student's motivation to pursue a career in science. The male student's motivation to pursue a career in science appears positively influenced by attendance at a technological institution or a coeducational liberal arts college, and to be negatively influenced by attendance at one of the men's colleges in the Northeast. The female student's motivation to pursue a career in science appears negatively related to the affluence of her institution. The characteristics of a student as an entering freshman affect his decision to pursue a career in science at graduation from college much more than do the characteristics of the college he attended.

Astin, A. W. Personal and Environmental Factors Associated with College Dropouts Among High Aptitude Students. Journal of Educational Psychology, 1964, 55, 219-227.

The tendency to drop out of college before completing the baccalaureate degree was examined in a 4-year longitudinal study of 6,660 Merit Finalists. Comparison of students who drop out of college with those who do not shows that the dropouts tend to come from lower socioeconomic backgrounds, to have lower ranks in high school, to plan initially to get lower college degrees, and to apply for relatively fewer scholarships. Personality measures suggest that dropouts are more aloof, self-centered, impulsive, and assertive than nondropouts. Effects of 15 college characteristics were analyzed using 38 student input variables as controls. The male student's tendency to drop out of college was not affected by college characteristics. The female student was more likely to drop out if she attended a college with a relatively high proportion of men in the student body.

Nichols, R. C. Effects of Various College Characteristics on Student Aptitude Test Scores. Journal of Educational Psychology, 1964, 55, 45-54.

A sample of 356 National Merit Finalists attending 91 colleges was used to assess the effects of colleges on student Graduate Record Examination performance. Precollege characteristics of the students were controlled by multiple partial correlation. Colleges tended to influence the Verbal and Quantitative scores of the students in opposite directions. Northeastern men's colleges tended to increase the Verbal relative to the Quantitative scores, while the reverse was true of technical institutes and state universities. The student's major field of study had a similar reciprocal effect on the Verbal and Quantitative scores, but most of the differences between colleges remained when the effect of major field was controlled. The size of college effects was small relative to the precollege differences between students.

Astin, A. W. Effect of Different College Environments on the Vocational Choices of High Aptitude Students. Journal of Counseling Psychology, 1965, 12, 28-34.

A 4-year longitudinal study examined the effects of various college characteristics on the career choices of 3,538 Merit Finalists. Measures of the environments of the 73 institutions attended by the students were used as independent variables. Results of multiple regression analyses, in which 17 precollege student input variables were controlled, provided some support for the hypothesis that the student's career choice comes to conform more and more to the career choice type dominant in his college environment.

Nichols, R. C. Personality Change and the College. American Educational Research Journal, 1967, 4, 173-190.

A 4-year longitudinal study of 432 boys attending 104 different colleges and 204 girls attending 86 different colleges investigated changes in personality and interests during the college years as measured by the 16PF, the VPI, and 10 a priori personality scales. Subjects were Merit Finalists. During college the students' motives and interests became more specific and differentiated, they became more aware of their own shortcomings and negative feelings, and they became less dependent on external standards for behavior. With the initial status of the student controlled by multiple part correlation, a factor analysis of the residuals (a measure of change) yielded six orthogonal change factors identified as Diversity of Interest, Femininity, Extraversion, Anxiety, Dominance, and Super-ego. Correlation of the change factors with 18 characteristics of the student's college revealed that the affluence of the college relatively increased extraversion, and that the realistic (practical) emphasis in the college curriculum relatively increased anxiety in both sexes. For girls, affluence also increased dominance, and the business emphasis of the curriculum increased masculinity.

Watley, D. J., and Merwin, J. C. An Attempt to Improve Prediction of College Success by Adjusting for High School Characteristics. American Educational Research Journal, 1967, 4, 229-240.

This study was designed to assess the value of adjusting predicted college grades for high school characteristics. Sets of prediction equations were developed and cross-validated to determine the inter-school contributions to variance at different levels of high school location and size of graduating class. Some evidence was found that high school rank predicts with differential efficiency for subgroups within a college sample. However, the size of these subgroups generally appeared too small in numbers to significantly affect the size of the "total" validity r's obtained for an entire college sample.

Werts, C. E. The Study of College Environments Using Path Analysis. NMSC Research Reports, 1967, 3, No. 4.

In the usual college studies, the investigator frequently has to interpret a matrix of intercorrelations between environmental variables, student experiences, and changes in student characteristics during college. If these correlations are to be used to determine how the college environment influences, or is influenced by, the students, a number of assumptions must be made about the variables under study. This interpretive problem can be handled by path analysis, a technique which specifies the logical consequences of the assumptions. To show how path analysis helps to render interpretations explicit, consistent, and more susceptible to rejection, a current research problem is studied in detail here.

Werts, C. E. The Partitioning of Variance in School Effects Studies. American Educational Research Journal, 1968, 5, 311-318.

One of the most common procedures in school effects studies is multivariate regression analysis employed in conjunction with an input-output model. In the usual, two-step regression method, student input is controlled by first computing from the input variables an "expected" output for each school. The difference between the observed and the "expected" output is then used as the dependent variable, and the school environment variables as the independent variables, to determine the influence of the school environment. An alternative procedure to the two-step method is discussed in which both student input and college environment variables enter into a single regression equation.

Werts, C. E., and Watley, D. J. Analyzing College Effects: Correlation vs. Regression. American Educational Research Journal, 1968, 5, 585-598.

In studying college effects, an input-output model is commonly used in which student input is controlled by using regression analysis to compute an "expected" output. The part correlation of the college environment variable and the output with input variance removed only from the output is interpreted as a measure of the college effect. However, this is not the most useful procedure that may be used since part (or partial) correlation may severely underestimate the magnitude of the true college effect. Interpreted within a causal model, partial regression coefficients appear to be a generally more satisfactory measure of college effects. Four models are used to illustrate the advantages of using partial regression coefficients in a causal framework. Another advantage in using these coefficients is that they have greater stability across different units of measurement.

Werts, C. E., and Watley, D. J. A Student's Dilemma: Big Fish--Little Pond or Little Fish--Big Pond. Journal of Counseling Psychology, 1969, 16, 14-19.

Relative deprivation theory (Davis, 1966) postulates that attending a highly selective college adversely affects motivation for graduate study because students usually obtain relatively poorer grades than they would have at a less selective college; the poorer grades leading to a relatively low self-evaluation of their intellectual capacity for graduate study. Alternatively, environmental press theory (Thistlethwaite and Wheeler, 1966) posits that motivation for graduate study is increased by attending a highly selective college because the environmental press favors advanced study. A logical model for testing the contrasting predictions of the two theories and some preliminary evidence favoring relative deprivation theory are presented.

Werts, C. E. The Partitioning of Variance in School Effects Studies: A Reconsideration. American Educational Research Journal, 1970, 7, 127-132.*

Werts responds to comments made by Ward about an earlier Werts' paper entitled "The Partitioning of Variance in School Effects Studies." Essentially, Werts asserts that the squared beta statistical approach inherently flows from an interpretive framework whose prime purpose is the development of theory. Any attempt to interpret such statistics in terms of the traditional psychometric "prediction" viewpoint will prove misleading.

CAREER CHOICE

Holland, J. L. A Theory of Vocational Choice. Journal of Counseling Psychology, 1959, 6, 35-45.*

Six types of occupational environments and the model personality types of people assumed to be attracted to each are discussed. The theory outlines a process of vocational choice which would result in a congruence beteeen personality type and occupation. Implications of the theory for research are discussed.

Holland, J. L. Some Explorations of a Theory of Vocational Choice: I. One- and Two-Year Longitudinal Studies. Psychological Monographs, 1962, 76 (26, Whole 545).*

The characteristics of six personality orientations derived from the six occupational preference scales from the Vocational Preference Inventory were studied using the 16PF, National Merit Student Survey, SAT scores, high school rank, and teacher and self-ratings. Subjects included several samples of Merit Finalsits. Results indicate that: (a) Students with different dominant personality orientations (coded VPI scales) have significantly different attributes, (b) different dominant personality orientations lead to different kinds of achievement goals, (c) institutional environment appears related to the six model orientations and fosters change in major field in different degrees.

Holland, J. L. Explorations of A Theory of Vocational Choice, Part I. Vocational Images and Choice. Vocational Guidance Quarterly, 1963, 11, 232-239.*

This is the first of a four part series which describes and attempts to test a theory of vocational choice. The sample consists of 360 boys and 278 girls who, as high aptitude students, were National Merit Finalists and Commended students. This part of the series dealt with vocational images and vocational choice. Vocational images were obtained for six occupations: Engineer, Physicist, Teacher, Accountant, Business Executive, and Artist. Holland concluded that "students of superior aptitude perceive occupations in stereotyped ways which tend to be consistent with some of the personality and originality variables associated with vocational choices and preferences."

Holland, J. L. Explorations of A Theory of Vocational Choice, Part II. Self-Descriptions and Vocational Preferences, and Part III. Coping Behavior, Competencies, and Vocational Preferences. Vocational Guidance Quarterly, 1963, 12, 17-24.*

High-aptitude high school seniors, many of them Merit Finalists, completed the Vocational Preference Inventory and also described themselves via an adjective checklist. Biserial correlations computed between these two sets of data showed that vocational preferences are linked with self-concepts in expected ways. Students were also asked for reports on reactions to stress, competencies in various fields, and most enjoyable activities. The results are, in general, consistent with the theoretical expectations for the six VPI scales, although certain inconsistencies do turn up (as with girls who score high on the Enterprising scale).

Holland, J. L. A Theory of Vocational Choice and Achievement: II. A Four Year Prediction Study. Psychological Reports, 1963, 12, 547-594.* Southern University Press 1963 Monograph Supplement 4-V12.*

Data were obtained from a sample of 592 Merit Finalists at the end of their senior year in high school and again at the end of their senior year in college, and were used to test a theory of vocational choice and personality type. Personal constructs in the theory are defined by selected scales of the Strong Vocational Interest Blank and environmental constructs by the Environmental Assessment Technique. Generally, the students who resembled the theoretical models possessed the hypothetical traits attributed to each model. The prediction of vocational choice and its stability was studied by analyses of model student types in different college environments. Congruence between the student type and the college type was conducive to student stability in vocational choice and major field. Student stability and achievement are more closely related to personality attributes, although they are related to both personality and institutional attributes.

Holland, J. L. Explorations of A Theory of Vocational Choice, Part IV. Vocational Daydreams. Vocational Guidance Quarterly, 1963-64, 12, 93-97.*

Some general hypotheses from a theory of vocational choice were tested in a sample of 360 male and 278 female Merit Finalists. Vocational preferences were generally found to be associated with self-descriptions, coping behavior, daydreams about vocations, developmental histories of successive vocational choices, and student images of vocations in accordance with the theory.

Holland, J. L., and Nichols, R. C. Explorations of A Theory of Vocational Choice: III. A Longitudinal Study of Change in Major Field of Study. Personnel and Guidance Journal, 1964, 42, 235-242.*

A theory of vocational choice was examined by testing some of its general hypotheses in a longitudinal study. Changes in major field plans for a 1-year period (high school senior year to end of freshman year in college) were studied by assessing a sample of Merit Finalists (332 boys and 181 girls) in high school with interest, personality, originality,

achievement and aptitude measures, and self-ratings. Students were reassessed in college, and pre- and postcollege freshman-year plans were compared. Remaining in a given field appears to be associated with having personal attributes commonly associated with the typical student in that field, while leaving a field is related to dissimilarity between a student's attributes and those of the typical student.

Astin, A. W., and Nichols, R. C. Life Goals and Vocational Choice. Journal of Applied Psychology, 1964, 48, 50-58.

Factor analyses of 56 life-goals and self-rating items were performed on separate samples of 250 male and 250 female Merit Finalists. Seven identifiable factors were replicated in the two analyses: Self-Esteem and Scholarship (primarily associated with self-ratings); Personal Comfort, Prestige, and Altruism (primarily associated with life goals); and Artistic Motivation and Science-Technology(associated with both self-ratings and with life goals). Analyses of four life-goal factor scores using 5,495 high aptitude students divided into 36 career field groups revealed great differences in the life goals of students pursuing different careers. Results with an open-ended question about life goals supported this finding.

Holland, J. L., and Nichols, R. C. The Development and Validation of an Indecision Scale: The Natural History of a Problem in Basic Research. Journal of Counseling Psychology, 1964, 11, 27-34.

A 15-item scale was derived by item analysis of 273 items concerning high school activities against a criterion of reported indecision about career choice using a sample of 1,000 Merit Finalists. Correlations of the scale with various personality and interest inventories, self-ratings and life goals suggests that the scale is positively associated with both the potential for and performance of creative work, especially in the fine arts.

Nichols, R. C. Career Decisions of Very Able Students. Science, 1964, 144, 1315-1319.

A study of trends in the career choices and prospective major fields of Merit Semifinalists from 1957 through 1963 revealed a declining interest in careers in business, engineering, journalism, and physical sciences. There was increased interest in biology, languages, history, mathematics, and social sciences. A study of changes in major field and career choice of 6,661 Semifinalists during four years of college showed: (a) net losses for education, engineering, medicine, music, and physics, and (b) net gains for English, history, languages, philosophy, political science, and psychology.

Holland, J. L. The Psychology of Vocational Choice. New York: Ginn & Co., 1966.

A discussion of characteristics of people in various occupations in the light of a theory of vocational choice.

Nichols, R. C. Career Decisions of Able Students. Think, 1965.*

Trends in career and major field choices of all National Merit Semifinalists were studied for the period 1957-1964. Changes during the college years in major field and career choice of 6,661 Merit Semifinalists were also studied. In both samples the general trend reflects growing interest in teaching as a career and in the humanities as a major field area. There was a declining interest in engineering and the physical sciences. Possible reasons for these trends are discussed.

Werts, C. E. Social Class and Initial Career Choice of College Freshmen. Sociology of Education, 1966, 39, 74-85.

The relationship between career choice of students and the occupation of their fathers was studied using samples of 16,141 male and 14,417 female entering college freshmen. Sons tended to overchoose their father's occupations as a career in every case where this was possible, but this "father-model" effect generally did not hold for girls. When fathers' occupations were categorized into socioeconomic groupings (SES) it was found that low SES boys tended to overchoose careers as engineer, teacher, chemist, accountant, clergyman, and farmer; high SES boys tended to overchoose careers as physician, lawyer, and college professor; intermediate SES boys tended to overchoose careers as businessman, physicist, dentist, mathematician, and architect. Low SES girls tended to overchoose careers as teacher, nurse, and lab-technician; high SES girls tended to overchoose careers as social worker, psychologist, and housewife; intermediate SES girls tended to overchoose careers as journalist and speech therapist.

Werts, C. E. Career Changes in College. Sociology of Education, 1967, 40, 90-95.

Changes in career plans during the freshman year were studied using a sample of male students from 248 heterogeneous colleges who were planning careers as engineers (N=1,999), teachers (N=1,816), physicians (N=1,576), businessmen (N=928), lawyers (N=869), chemists (N=484), accountant (N=420), and physicists (N=391). The results support the generalization that in terms of academic ability and social class background, students who are unlike the majority of the other students with the same initial career choice tend to change their career plans to another field where they will be more like the other students. Other results suggested that sons who chose the same occupations as their fathers were less likely to change their career plans than others making those career choices.

Werts, C. E. Career Choice Patterns: Ability and Social Class. Sociology of Education, 1967, 40, 348-358.

Data from 76,015 male and 51,110 female college freshman from 248 colleges and universities were analyzed to determine the relationship of social class and ability to career choice. In general, it was found that students at each ability level tend to have different career choices, depending on their class background. A separate study of career choices of women indicated that those women who choose nontraditional careers (traditional careers are teacher, nurse, social worker, clerical worker, and laboratory technician) come from high socioeconomic background, even if the same career(s) draw low SES males (e.g., pharmacist or engineer).

Watley, D. J. Stability of Career Choices of Talented Youth. NMSC Research Reports, 1968, 4, No. 2.

The purposes of this study were to report the precollege career plans of Merit Scholars and to trace the extent to which their precollege career plans remained stable or changed 7 to 8 years after they entered college. Among men, the physical sciences, mathematics, and engineering were consistently the most popular initial choices. Women most often chose the physical sciences, mathematics, and education as precollege career objectives. Neither sex expressed much interest in entering the biological or social sciences. Considerable change among career fields was found for each sex. Among men, engineering suffered the greatest loss of talent to the other career fields; medicine, law, and the biological sciences were the only fields keeping at least 50% of their initial recruits. Education initially attracted large proportions of women, but subsequently lost many to other fields.

Werts, C. E. Paternal Influence on Career Choice. Journal of Counseling Psychology, 1968, 15, 48-52.

Father's occupation was compared with son's career choice for a sample of 76,015 male, college freshmen. Results indicated that certain types of fathers' occupations were associated with similar types of career choices by sons. Boys whose fathers were in scientific occupations (engineers, military officers, architects, biologists, chemists, and physicists) were likely to choose careers in the scientific areas--engineer, chemist, physicist, architect, mathematician, and biologist. Sons of fathers in medical fields (pharmacists, osteopaths, chiropractors, optometrists,

dentists, and physicians) tended to choose medical careers --veterinarian, pharmacist, dentist, and physician. And boys whose fathers were in occupations involving teaching or guidance (teachers, school and college administrators, clergymen, and social workers) gravitated towards similar careers, such as teacher, clergyman, college professor, social worker, and missionary.

Werts, C. E., and Watley, D. J. Determinants of Changes in Career Plans During College. Sociology of Education, 1968, 41, 401-405.

According to Davis's theory of the determinants of career changes during college, "deviants" in a given field tend to switch out, and students with traits characteristic of the field tend to switch in. Thus it is predicted that each career field should gradually become more homogeneous, and that the differences between fields should increase during the college years. Reanalysis of data from a recent study by Werts indicate that these predictions are not confirmed and that a more complex theoretical model is required.

Watley, D. J., and Nichols, R. C. Career Decisions of Talented Youth: Trends over the Past Decade. NMSC Research Reports, 1969, 5, No. 1 (also data for males only, in Journal of Engineering Education, 1969, 59, 975-978).

Various trends were found in the educational major and career choice decisions of National Merit Finalists over the past decade. If these decisions are considered representative of students in the top 1% of measured scholastic ability, many of the temporal shifts observed are large enough to have a marked effect on the availability of talented people to work on the problems associated with different career fields.

Watley, D. J., and Werts, C. E. Career Selection: Turnover Analysis and the Birds of a Feather Theory. Journal of Counseling Psychology, 1969, 16, 254-259.

Many students change their career plans as they progress through college. Davis' theory, which assumes that students' traits (e.g., ability) are relatively stable, attempted to account for the changes that occur in students' career plans. Using a procedure called turnover analysis, he observed a trend toward social homogeneity--the tendency for students who were alike in certain respects to "flock" together. However, the statistical analyses used by Davis probably did not provide a logically meaningful test of his hypotheses. A logically more defensible analysis was proposed, and the results obtained did not support Davis' theory.

TWIN STUDIES

Nichols, R. C. The Inheritance of General and Specific Ability. NMSC Research Reports, 1965, 1, No. 1.*

Analysis of National Merit Scholarship Qualifying Test scores of 687 identical and 483 fraternal sets of twins indicates that about 70% of the variance in general ability is determined by heredity. Independent residual scores for each of five subtests were computed as measures of specific abilities. About 70% of the variance of the residuals also seems to be determined by heredity. The findings support a theory of intelligence assuming a large number of independently inherited components of ability.

Nichols, R. C. The National Merit Twin Study. In Vandenberg, S. G. (Ed.), Methods and Goals in Human Behavioral Genetics, New York: Academic Press, 1965.

This paper discusses the methodology and initial results of a study of 1,507 sets of twins that were identified in the 1962 administration of the NMSQT. Among the methodological problems explored are diagnosis of twin zygosity and estimation of heritability from twin correlations. Correlations of NMSQT scores for identical and fraternal twins suggest that the subtest pattern as well as the composite score is substantially influenced by hereditary factors.

Nichols, R. C., and Bilbro, W. C. The Diagnosis of Twin Zygosity. Acta Genetica et Statistica Medica, 1966, 16, 165-175.*

An index for diagnosing twin zygosity from a physical similarity questionnaire was developed on the basis of responses of 123 sets of twins diagnosed by blood typing. Cross-validation of a preliminary index and intraclass correlations of intelligence for 1,239 sets of twins indicates that about 95% of all twins can be diagnosed by the index with greater than 90% accuracy.

Nichols, R. C. The Resemblance of Twins in Personality and Interests. NMSC Research Reports, 1966, 2, No. 8.

The California Psychological Inventory, the VPI, and the OBI were administered to 498 sets of MZ twins and 391 sets of DZ twins of high school age. Intraclass correlations computed separately by sex showed significantly greater similarity between DZ twins for most of the inventory scales and for about half of the individual items. Three aspects of the results prevent their interpretation as evidence of hereditary influence on personality: (a) the differences in similarity between the two kinds of twins showed little agreement between the two sexes, (b) many of the differences in similarity between the two kinds of twins were larger than would be expected from the genetic model, and (c) there was little agreement between the findings of this study,and those of another twin study using the CPI. Because of these inconsistencies the major value of the results is in their implications for the methodology of twin studies of personality.

ASSESSMENT METHODS

Holland, J. L. A Personality Inventory Employing Occupational Titles. Journal of Applied Psychology, 1958, 42, 336-342.*

The hypothesis that a useful personality inventory may be constructed from occupational interest test content was explored further with the Holland Vocational Preference Inventory. Two scales survived cluster analysis, using 300 college freshmen; to these were added masculinity-femininity, status, infrequency, and acquiescence scales. The median estimated retest reliability after four months was .75. Differentiation was obtained between matched control and psychiatric samples. Profiles of university freshmen on the basis of college choice were also differentiated.

Holland, J. L. A Note on the Reliability and Validity of the Minnesota Scale for Paternal Occupations as an Estimate of Family Economic Status. Journal of Applied Psychology, 1958, 42, 195-196.*

The Minnesota Scale for Paternal Occupations was related to family income in approximately a 20% sample of Merit Finalists. The scale appears useful as a crude index of fathers' net income for group purposes. The classification process itself has relatively high inter-observer reliability for a sample of two judges.

Holland, J. L. The Relation of the Vocational Preference Inventory to the Sixteen Personality Factor Questionnaire. Journal of Applied Psychology, 1960, 44, 291-296.*

The VPI and Form A of the 16PF were administered by mail to 1,177 Merit Finalists, and the scores were intercorrelated. Results provided generally positive evidence for the construct validity of the VPI.

Holland, J. L. Some Explorations with Occupational Titles. Journal of Counseling Psychology, 1961, 8, 82-87.*

A review of Holland's work with the Vocational Preference Inventory.

Crawford, N. C., Jr. The Federal Income Tax Approach to Needs Analysis. Journal of the Association of College Admissions Counselors, 1962, 8, 11-14.*

A discussion of the NMSC system of needs analysis. The amount of federal income tax paid is a close approximation to the expected annual family contribution to college expenses as determined by more elaborate methods of needs analysis.

Nichols, R. C. Subtle, Obvious and Stereotype Measures of Masculinity-Femininity. Educational and Psychological Measurement, 1962, 22, 449-461.*

Three experimental MF scales were constructed on the basis of combinations of sex differences in item response and the general expectation of a sex difference, using a sample of 412 students. The Subtle scale was composed of items showing sex differences of which people are not generally aware; the Stereotype scale was composed of items showing no sex difference for which there is a general expectation of a sex difference; and the Obvious scale was composed of items showing a sex difference of which people are generally aware. The Subtle scale was found to have low internal consistency, probably because of the small number of good items available. The Subtle and Stereotype scales correlated -.44 for female subjects and -.49 for male subjects. Possible explanations for this negative relationship, as well as other correlations among various MF scales, are discussed.

Nichols, R. C. A Factor Analysis of Parental Attitudes of Fathers. Child Development, 1962, 32, 791-802.*

A factor analysis of 25 scales of the Parental Attitude Research Instrument for fathers yielded 5 factors labeled Authoritarian Control, Marital Conflict, Democratic Attitudes, Punishment Orientation, and Firm Discipline. These factors were surprisingly similar to factors found by other investigators in parental attitudes of mothers. Factor scales were developed to measure the first three factors.

Nichols, R. C., and Schnell, R. R. Factor Scales for the California Psychological Inventory. Journal of Consulting Psychology, 1963, 27, 228-235.

Scales were constructed to measure the two principal factors isolated in a factor analysis of 18 scales of the CPI. Correlations of these scales with a variety of test and behavioral variables suggests that they are similar to neuroticism and extraversion factors found in previous studies. The scales were called Person Orientation and Value Orientation. Implications of the findings for test theory are discussed.

Blumenfeld, W. S. Interrater Reliability: A Brief Empirical Reminder. Training Directors Journal, 1965, 19 (6), 17-20.*

The interrater reliability of a 22-item 5-point graphic rating scale for the rating of conference leadership was subjected to empirical examination. For 15 raters, the obtained coefficient was .59. Coefficients for 1, 5, 10, and 20 raters were also generated. Evaluation of the operational utility of the instrument was made in terms of the intended application and the operational conditions in which the instrument might be expected to be applied. Evaluated in these terms, and based upon the data, the instrument and accompanying procedure was judged to be psychometrically inadequate. A plea for attention to the estimation of interrater reliability was submitted.

Goldberg, L. R., and Werts, C. E. The Reliability of Clinicians' Judgments: A Multitrait-Multimethod Approach. Journal of Consulting Psychology, 1966, 30, 199-206.*

Four experienced clinical psychologists independently ranked each of 4 equated samples of 10 patients on 1 of 4 traits (Social Adjustment, Ego Strength, Intelligence, and Dependency), using 1 of 4 data sources (MMPI, Rorschach, Wechsler, and a Vocational History). A 4x4 Latin square design insured that the usual sources of judgmental confounding were absent from this study. The findings indicate quite clearly that the judgments of 1 clinician working from 1 data source bear no systematic relationship to those of another clinician working from another data source, even though both judges are ranking the same patients on the same trait. On the other hand judgments of diverse traits from the same data source do tend to be related.

Stalnaker, J. M. Suggestions for Improving Essay Questions. In Parker, R. K. (Ed.), Readings in Educational Psychology, Boston: Allyn and Bacon, Inc., 1968, 568-580.*

In spite of the increasing use of objective tests and of the unsolved problems connected with essay tests, essay questions continue to play an important part in the measurement of attainment--because they attempt to measure abilities which cannot be, or have not been adequately measured by objective tests, because their use has certain important effects on education, because they are traditional, and because they are or seem easy to prepare. If they are to be valuable as measuring instruments, however, teachers and test technicians must devote care and skill to framing questions and to developing dependable methods of evaluating the answers.

RESEARCH METHODS

Astin, A. W., and Salmon, Mary. A Computer Program for Normalizing Distributions of Variables. NMSC, 1963.* (mimeo)

This FORTRAN program normalizes distributions of integer variables by converting each set of observations first into %ile ranks and then into corresponding standard scores. A punched output of the normalized distributions (with provisions for ID numbers) is provided in addition to a listing of raw scores, ranks, and corresponding standard scores for each variable.

Astin, A. W. Types of Variables for Creativity Research. In Taylor, C. W. (Ed.), Widening Horizons in Creativity, New York: Wiley, 1964, 351-355.*

Measures of "creativity" used by various investigators are viewed as varying along two major dimensions: (a) naturalistic vs. manufactured, and (b) degree of social relevance.

Astin, A. W. Criterion-Centered Research. Educational and Psychological Measurement, 1964, 24, 807-822.

Criterion measures and their use in research are discussed. The paper is concerned with (a) the nature and role of the criterion, (b) criteria and test development, and (c) criterion-centered research vs. construct validity.

Cerbus, G., and Nichols, R. C. Significance Levels of Individual Correlations Selected from Multivariate Studies. Psychological Bulletin, 1964, 61, 400.*

In reply to criticisms of an earlier paper, the evaluation of the statistical significance of correlations selected from a large number is discussed. The significance test to be used depends on the method by which the correlation was selected.

Nichols, R. C., and Carson, Sally. The NMSC Intraclass Correlation Program. NMSC, 1964.* (mimeo)

This FORTRAN program computes intraclass correlations for groups of monozygotic and dizygotic twins, then computes heritability ratios and associated statistics. Provision is made for the addition of a subroutine to perform any desired transformation of the input data. Missing data are excluded from the computations.

Nichols, R. C., and Carson, Sally. NMSC Twin Correlation Matrix Program. NMSC, 1964.* (mimeo)

The FORTRAN program computes 8 different correlation matrices from twin data, separating the correlation between traits into heredity and environmental components. All 8 matrices are printed on output, 4 of the matrices (which might be used for subsequent factor analyses) are also punched in appropriate format for input to the MESA-1 factor

analysis program. Provision is made for the addition of a subroutine to perform any desired transformation of the input data. Subjects with missing data are excluded from the computations.

Nichols, R. C., and Tetzlaff, W. Test Scoring and Item Analysis Programs. Educational and Psychological Measurement, 1965, 25, 205-210.

Two FORTRAN programs are described. The first program reads in multiple punched item response cards, tallies all requested card positions, and prints out N's, percents, phi, and phi/phimax coefficients, and the item content. The user may sort the item response cards into the desired groups or the groups to be tallied may be formed by the computer on the basis of continuous score data on the subjects. The second program scores tests for up to 30 keys when test item responses are multiple punched on IBM cards in the same format used by the first program. Scores and identifying data are punched and printed for each subject.

Blumenfeld, W. S. A Research Note on the Method of Error-Choice. Educational and Psychological Measurement, 1966, 26, 847-851.*

The purpose of this investigation was to determine the extent of relationship between error-choice item and a criterion of affect for an attitude object. A questionnaire, the topic of which was attitudes towards physicians, was administered nationally to high school students and to one parent of each student; it contained 3 item types--biographic, semantic differential, and attitudinal. The research samples upon which this report is based contained 1,000 students and one parent of each of the students, i.e., 1,000 students and 1,000 adults. From the responses to the semantic differential scales, a composite image criterion for students and a composite image criterion for parents was developed which reflected individual differences in effect for the attitude object, physician. The data in this investigation indicated that the error-choice item was not related to the criterion of attitude object affect in either the student sample or the parent sample; however, the item was related to student grade in school, sex of student, color of student, grades attained, desire of the student to become a physician, student viewing of TV medics, education of parent, political preference of parent, and parent viewing of TV medics.

Nichols, R. C., and Meyer, M. A. Timing Postcard Follow-ups in Mail Questionnaire Surveys. Public Opinion Quarterly, 1966, 30, 306-307.*

Response rates to a questionnaire were increased by sending a postcard three days after the questionnaire, followed by one three weeks later.

Blumenfeld, W. S. Selecting Talented Negro Students: Nomination vs. Test Performance. NMSC Research Reports, 1969, 5, No. 6.

Students were identified for participation in the third annual National Merit Achievement Scholarship Program by two methods: (1) all U. S. high schools were asked to nominate talented Negro students and (2) high scoring Negro students were identified on the National Merit Scholarship Qualifying Test. Of the 5,624 participants, about 20% entered the competition by nomination only, about 20% by test only, and the remainder were both nominated and took the test. A comparison of these groups indicated that the test tended to identify students of higher socioeconomic status, they had higher test scores and lower high school grades, and they attended larger and better equipped high schools than did those identified by the nomination procedure.

LATE REPORTS

Borgen, F. H. Computer-Based Intraindividual Measurement Using Comparative Judgment Method. Proceedings of the 77th Annual Convention of APA, 1969, 917.

Using the reactive capacity of the computer, it may be possible to devise effective sequential measurement strategies which identify variables germane to the decisions of a given person, and then measure each of these relevant dimensions with the appropriate degree of precision. Potential strategies for intraindividual measurement using the comparative judgment method are outlined. These approaches have special implications for traditional psychometric concepts such as reliability, validity, and item characteristics.

Stalnaker, J. M. Evaluation and the Award of Scholarships. In the Sixty-eighth Yearbook of the National Society for the Study of Education. Chicago: University of Chicago Press, 1969, 102-114.*

Concerning the evaluation and the awarding of scholarships, Mr. Stalnaker discusses the general purposes of scholarships, the selection criteria typically used, and the relevance of research criteria in selection. The procedure involved in the selection of Merit Scholars is discussed, and some of the characteristics of Scholars, determined by research, are mentioned. Also discussed are some of the problems connected with widely used selection techniques.

Werts, C. E., and Watley, D. J. The Relationship of Parental Education to Achievement Test Performance of Girls vs. Boys. Sociology of Education, in press.

What effect does the level of parental education have on the ratio of boys to girls who obtain high test scores on a scholastic achievement test like the NMSQT? The sample consisted of 52,585 students who scored in approximately the top 2% on the NMSQT. The results suggested that mother's educational level is particularly important regarding the probability that girls are able to compete with boys on achievement tests.

* REPRINTS NOT AVAILABLE

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